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STUDY MATERIAL SCIENCE

CLASS-VII

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▸ Physical and chemical changes :

Rusting of Iron

When an iron object is left exposed to moist air, it chemically reacts with oxygen and water in the air to form a red-brown flaky substance called rust. The process of rusting can be represented by the following equation:

Iron (Fe) + Oxygen (O₂) (From air) + Water (H₂O)
→ Rust (Iron oxide, Fe₂O₃)

Rusting occurs in the presence of both oxygen and water. The more humid the air, the faster the rusting occurs. The rust slowly eats away or corrodes the iron, leading to considerable loss. Since iron is used in making bridges, ships, * cars, truck bodies and many other articles, the monetary loss due to the rusting is huge.

Preventions of Rusting

Rusting can be prevented by not allowing the iron to come in contact with moisture and air. The simplest method is to coat the iron with oil, grease or paint. These coats should be applied regularly to prevent rusting.

A more efficient method is to coat the iron with another metal such as zinc or chromium. The process of depositing a layer of zinc on iron is called

galvanisation. The iron pipes we use in our homes to carry water are galvanised to prevent rusting.

Rusting of ships is a major problem in the shipping industry as the body of a ship is always in contact with water and the air around it is also very humid. The salt in water speeds up the process of rusting. This leads to huge monetary loss to the shipping industry. Rusting of iron can be prevented by allowing it to make stainless steel. Stainless steel is made by mixing iron with carbon and metals like chromium, nickel and manganese. It does not rust.

Crystallisation

Seawater contains salts dissolved in it which makes it salty. We have learnt in Class VI that salt can be obtained from seawater by the process of evaporation. The salt obtained in this manner is not pure and its crystals are small. The shape of the crystals cannot be seen clearly. Large crystals of pure substances can, however, be obtained from their solutions by the process of crystallisation. It is an example of a physical change. The process of cooling a hot concentrated solution of a substance to obtain crystals is called crystallisation. The process of crystallisation is used to obtain crystals of a pure solid substance from the impure solid substance.

Impure copper sulphate powder can be purified by the process of crystallisation to obtain large crystals of pure copper sulphate.